

School of Computer Science

Machine Learning in Fulfilment of

SPEC9270

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Declaration of Ownership: I declare that the attached work is entirely my own and that all sources have been acknowledged: 🗹

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**List of Abbreviations**

|  |  |
| --- | --- |
| ML | Machine Learning |
| D.I.D | Dissociative Identity Disorder |
| NLP | Natural Language Processing |
| fMRI | Functional Magnetic Resonance Imaging |
| MRI | Magnetic Resonance Imaging |

Definition of problem – Kaggle Contest Entered

The Kaggle contest entered is the **MLSP 2014 Schizophrenia Classification Challenge** [1], although the competition is over it is still possible to submit work and receive an evaluation. My reasoning for picking this competition is that I wanted to study psychology and go into research particularly in dissociative disorders and schizophrenia, however due to personal circumstances at the time I went with engineering.

Today, I’m still interested in a PhD and have gained a different perspective I otherwise wouldn’t have had, one that sees that there are a lot of holes and short comings of traditional diagnosis of mental disorders such as D.I.D and schizophrenia. All of which hopefully can be dealt with machine learning (ML).

Some of these short comings are that there is no process to date that properly diagnoses D.I.D, despite it being acknowledged as a mental illness in the 1950s, research between then and now has been done but was later found to be fraudulent or difficult to reproduce.[2]

While remaining brief and acknowledging other issues that stem from the use of machine learning (ML), MRI and fMRI images can be fed to ML algorithms in order to be used as a tool that can help clinicians avoid misdiagnosis. Young girls tend to not be diagnosed with ADHD because it manifests differently [3], having a better system for such differences in mental health would help avoid undiagnosed patients in situations such as school performance.

Currently the best/popular go to method is MRI image classification as they are interpretable by clinicians and can be examined after a ML model points to one claiming “that one there seems off”, this is temporary solution to deep learning techniques being powerful for classification yet uninterpretable which is a huge deficit for application in healthcare. This is why, currently, I think ML will be another tool for diagnosis not a replacement or augmentation of existing methods.

Having said that, there are other areas such as using NLP for diagnosing/detecting the onset of Alzheimer’s disease [4].

This is where I want to step in, I want to spend time to develop skills and knowledge in machine learning, leveraging my engineering experience in order to transition into ML in mental health, an area my workplace (IBM) is active in.

This project hopefully will be an introduction to that, the dataset used in this project is in a different format then what I expected, I approach it as a learning opportunity for the future.

Models Built – Model Configuration

Data preparation

Implementation

Local Evaluation – Evaluation Strategy

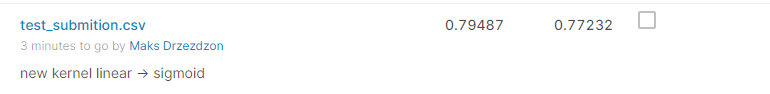
Model evaluation

Local Evaluation – Results Critique

Test test test test

Kaggle – Performance Report

First attempt with SVM resulted in



To-do’s – Further work

<https://www.scribbr.com/dissertation/list-of-abbreviations/#:~:text=The%20list%20of%20abbreviations%20should,define%20abbreviations%20within%20the%20text>.

# References

[1]Network, M. R. (2014). *MLSP 2014 Schizophrenia Classification Challenge - Diagnose schizophrenia using multimodal features from MRI scans*. Retrieved from Kaggle: https://www.kaggle.com/c/mlsp-2014-mri

[2]David Blihar, E. D. (2020). A systematic review of the neuroanatomy of dissociative identity disorder. *Elsevier*, https://doi.org/10.1016/j.ejtd.2020.100148.

[3]CONNOLLY, M. (2020, Jan 17). *adhdireland*. Retrieved from Easy-to-Miss ADHD Symptoms in Girls: https://adhdireland.ie/what-adhd-looks-like-in-girls/

[4]Elif Eyigoza, S. M. (2020). Linguistic markers predict onset of Alzheimer's disease. *Elsevier*, 10.1016/j.eclinm.2020.100583.